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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/982,845 | 10/22/2001 | Takaharu Kondo | 35.C15894 | 8377 |

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| EXAMINER | |
|---|---|
| GEBREMARIAM, SAMUEL A | |
| ART UNIT | PAPER NUMBER |
| 2811 | |

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/982,845 | KONDO ET AL. | |
| | Examin r | Art Unit | |
| | Samuel A Gebremariam | 2811 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-8, are rejected under 35 U.S.C. 102(e) as being anticipated by Sano US patent No. 6,211,454.

Regarding claim 1, Sano teaches (figs. 1 and 2) a silicon-based film comprising a crystal phase formed on a substrate (101) with a textured shape wherein the silicon-based film is formed on a substrate with a surface of the textured structure, the surface shape of the substrate is represented by a function f, wherein the silicon-based film is formed on a substrate with a surface shape having a standard deviation of an inclination arc tan (df/dx) from 15° to 55° within the range of a sampling length dx from 20 nm to 100 nm (fig. 2, col. 19, line 10- col. 20 line 2).

Since the structure taught by Sano is identical to the claimed invention, a Raman scattering performed on Sano's structure would inherently result in a scattering strength resulting from an amorphous component in the silicon-based film that is not more than a Raman scattering strength resulting from a crystalline component, and a difference between a spacing in a direction parallel to a principal surface of the substrate and a spacing of single crystal silicon would be within the range of 0.2% to 1.0% with regard to the spacing of the single crystal silicon.

Regarding claim 2, Sano teaches the entire claimed structure of claim 1 above including the silicon-based film according to claim 1, comprises a crystal of a columnar structure in a thickness direction.

The limitation that the silicon-based film comprises a crystal of columnar structure depends on the substrate. Since the support substrate and silicon based film of Sano's structure are identical to the claimed structure it would inherently have a columnar structure in the thickness direction.

Regarding claim 3, Sano teaches the entire claimed structure of claim 1 above including the silicon-based film according to claim 1, a percentage of diffraction strength of (220) plane due to X-ray or electron beam diffraction is 30% or more of total diffraction strength.

The limitation that the silicon-based film have a percentage of diffraction strength of (220) plane due to X-ray or electron beam diffraction is 30% or more of a total diffraction strength depends on the silicon based film and the substrate. Since the

support substrate and silicon based film of Sano's structure are identical to the claimed structure it would inherently have x-ray diffraction results as claimed.

Regarding claims 4 and 5, Sano teaches the entire claimed structure of claim 1 above including the silicon-based film according to claim 1, is formed by a plasma CVD method using a high frequency wherein the high frequency is not less than 10 MHz but no more than 10 GHz (col. 11, lines 40-62).

Regarding claim 6, Sano teaches the entire claimed structure of claim 1 above including the silicon-based semiconductor layer having at least one pin junction on a support, wherein at least one i-type semiconductor layer comprises the silicon-based film as set forth in any one of claims 1 to 5 (col. 10, line 64- col. 11, line24).

Regarding claim 7, Sano teaches the entire claimed structure of claim 1 above including the silicon-based semiconductor layer is formed on a substrate comprising at least a first transparent conductive layer (103) stacked on the support (101), and the first transparent conductive layer (101) has the surface shape textured as the substrate (col. 8 lines 10-15).

Regarding claim 8, Sano teaches (fig. 1) the entire claimed structure of claim 1 above including the support is a conductive support (col. 1, lines 8-27).

***Response to Arguments***

2. Applicant's arguments with respect to claims 1-8 have been considered but they are not persuasive. Applicant argues that the Sano reference does not teach the difference between a spacing in a direction parallel to the principle surface of the substrate and a spacing of a single crystal silicon is within the range of 0.2% to 1.0%.

As discussed above both Raman scattering and x-ray diffraction techniques are non-evasive measurement tools that are routinely used to study surface topography of thin film structures. Since the structure taught by Sano is identical to the claimed invention, both Raman and x-ray diffraction results would indicate that the difference between the spacing in a direction parallel to the principle surface of the substrate and a spacing of the single crystal silicon would fall within the range of 0.2% to 1.0%.

***Conclusion***

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on 8:00am-4: 30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 305-1690. The fax phone numbers for

the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Samuel Admassu Gebremariam
January 11, 2004

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800